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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/842,650	04/27/2001	Akihisa Hongo	2001_0519A	7681

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EXAMINER

MACARTHUR, SYLVIA

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 05/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No.	Applicant(s)	
	09/842,650	HONGO ET AL.	
	Examiner	Art Unit	
	Sylvia R MacArthur	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 January 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 40-98 is/are pending in the application.
- 4a) Of the above claim(s) 40-83,97 and 98 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 84-93 is/are rejected.
- 7) ☒ Claim(s) 94-96 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 April 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Newly submitted claims 40-83, 97, and 98 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:

Claims 40-83, 97, and 98 are held to a method while claims 84-96 are held to an apparatus.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 40-83, 97, and 98 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 103

2. Claims 84-90 and 92-96 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Shinbara (US 4,788,994) in view of Hey et al (US 6,551,488), in further view of Uzoh et al (US 6,612,915).

Shinbara teaches a multichamber processing system comprising a rapid thermal anneal (RTA) chamber 211 (annealing unit), see col. 4 lines 30-37.

Shinbara fails to teach a plating unit.

Regarding claim 84: Hey et al teaches a fountain plater 10 (a plating unit), col. 4 lines 11-16.

The motivation to provide a plating unit in the multichamber apparatus of Shinbara is that the type of processing chamber is an optimizable parameter in the art of multichamber cluster tool design. Plating units are known suitable means of depositing metal onto a substrate.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide a plating unit of Hey in the multichamber tool of Shinbara.

Neither Shinbara nor Hey teach reversing the voltage to etch the film in the electroplating unit.

Uzoh teaches the applied voltage in Fig. 2 can be reversed to electroetch the film. Uzoh teaches electroplating and electroetching in the same apparatus wherein the operation is basis the direction of the current and voltage, see col. 5 lines 30-33.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to utilize a plating unit such as one described by Uzoh where a film can be deposited or etched basis the direction of current and volt

Regarding claim 85: Shinbara and Hey both fail to teach a polishing station though a plurality of processing stations 218 were disclosed in col. 4 lines 40-45. The choice of introducing of polishing unit into the multichamber system of Hey is well within the skill of one designing semiconductor manufacturing equipment.

The motivation to introduce a polishing unit into the multichamber system of Hey is that polishing the semiconductor is a desired step in the manufacture of the semiconductor.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide a polishing unit in the apparatus resulting from the combined teachings of Hey and Shinbara.

Regarding claim 86: Following the reasoning of claim 85, CMP chamber are a known suitable type of polishing unit.

Regarding claim 87: This is an intended use limitation and is not given patentable weight.

Regarding claim 88: Shinbara teaches a spin-rinse-dry station 212 (cleaning unit), col. 4 line 35.

Hey fails to teach specifically a polishing station although a plurality of processing stations 218 were disclosed in col.4 lines 40-45. The choice of introducing a polishing unit into the multichamber system of Hey is well within the skill of one designing semiconductor manufacturing equipment.

The motivation to introduce a polishing unit into the multichamber system of Hey is that polishing the semiconductor is a desired step in the manufacture of the semiconductor.

The motivation to introduce the revolution member of Shinbara into the cleaning unit of Hey is that it provides a means to spin the wafer and promote uniform processing.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide the revolution member of Shinbara in the cleaning unit of the multichamber system of Hey.

Regarding claim 89: Shinbara does not teach that a cap plating unit however, the system of Shinbara does teach film forming units which are capable of performing the function of cap plating. Additionally the cap plating unit is seen as an intended use limitation.

Regarding claim 90:

Shinbara fails to teach a seed layer forming unit.

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Hey recites that the process cell 240 deposits a seed layer, see lines 24-29.

The motivation to provide a seed layer forming unit in the multichamber apparatus of Shinbara is that the type of processing chamber is an optimizable parameter in the art of multichamber cluster tool design. Seed layer forming units are known suitable means of depositing metal onto a substrate.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide a plating unit of Hey in the multichamber tool of Shinbara.

Regarding claims 92: Shinbara teaches an integrated bevel clean (IBC) system 235 (bevel etching unit).

Regarding claim 93: The units of Shinbara are interchangeable in that the order of unit introduction is based upon the desired substrate. The transfer robot allows the substrate to be introduced to the various processing units regardless of order or orientation of the processing station.

3. Claim 91 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shinbara and Hey as applied to claims above, and further in view of Koder a et al (US 5,695,601).

The teachings of Hey and Shinbara were discussed above.

Both fail to teach a film thickness measurement unit.

Koder a teaches an apparatus for planarising a semiconductor body by CMP. Fig. 2 illustrates a thickness measuring unit 30 in which is an optical sensor 31 (detection sensor) is provided.

Kodera teaches that his apparatus offers automatic measuring of the thickness of a film after polishing. This ensures that the polishing result has been accomplished with satisfactory, see col. 2 lines 33-37.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide a film thickness measurement unit for the apparatus of Hey introduced into the multichamber system of Shinbara.

Allowable Subject Matter

4. Claims 94-94 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art of record fails to teach or fairly suggest electroplating my applying a first and second current to the seed layer.

Response to Arguments

5. Applicant's arguments with respect to claims 84-96 have been considered but are moot in view of the new ground(s) of rejection.

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sylvia R MacArthur whose telephone number is 571-272-1438. The examiner can normally be reached on M-F during the core hours of 8 a.m. and 2 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory L. Mills can be reached on 703-308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.


Sylvia R MacArthur
Patent Examiner
Art Unit 1763

May 17, 2004


GREGORY MILLS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700